

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (*Currently Amended*) A perpendicular magnetic recording type disk drive comprising:

a double-layered perpendicular magnetic type disk medium having a recording magnetic layer of perpendicular magnetic anisotropy and a soft magnetic layer; and

a magnetic head containing a read head element ~~for reading~~ configured to read data from the disk medium,

wherein the read head element using includes a giant magnetoresistive (GMR) element, said giant magnetoresistive being configured to have a linear magnetic field response characteristic and when outputting a read signal waveform corresponding to a reproduction magnetic field from the disk medium, outputting the read signal waveform in which waveform distortion due to leaking magnetic field from the disk medium is suppressed, in response to a reproduction magnetic field from the disk medium, to output a signal waveform without distortion.

2. (*Currently Amended*) The disk drive according to claim 1, wherein the read head element ~~has a reproduction characteristic of~~ is configured to have a linear magnetic field response dynamic within a range that is larger than an average value of reproduction magnetic field from the disk medium, said range corresponding to a range of magnetic field in which output voltage is proportional to input magnetic field strength.

3. (*Currently Amended*) The disk drive according to claim 1, wherein the read head element ~~has a saturation magnetic field characteristic~~ a maximum magnetic field value at which the output voltage starts saturating with increased input magnetic field strength, the maximum magnetic field value being larger than the average magnetic field from the disk medium magnetized uniformly to any one of positive and negative polarities.

4. (*Currently Amended*) The disk drive according to claim 1, wherein ~~the read head element has a linear response magnetic field characteristic indicating a maximum value~~ a maximum magnetic field value at which an output voltage starts departing

from the linear magnetic field response is larger than the average magnetic field from the disk medium magnetized uniformly to any one of the positive and negative polarities.

5. *(Currently Amended)* The disk drive according to claim 1, wherein the read head element ~~has~~ further includes an artificial antiferromagnetic coupling magnetic field larger than the maximum magnetic field created by the magnetic flux that comes from the disk medium magnetized uniformly to any one of the positive and negative polarities.

6. *(Original)* The disk drive according to claim 1, wherein the read head element, assuming ~~that a~~ artificial antiferromagnetic coupling magnetic field is Hex, a shield gap length is Gs, a distance from the read head element to the surface of the recording magnetic layer is dmag, and remnant magnetization of the recording magnetic layer is Mr, has a characteristic satisfying a relational expression " $\text{Hex} > 8\text{Mr} * \arctan[\text{Gs}/(2\text{dmag})]$ ".

7. *(Currently Amended)* The disk drive according to claim 1, wherein the disk medium ~~has~~ further includes a bias magnetic field applying layer ~~for fixing that is configured to fix~~ a magnetization direction of the soft magnetic layer, and the read head element ~~has a characteristic that~~ further includes a hard magnetic film configured to generate a longitudinal bias magnetic field, ~~the a~~ direction of the longitudinal bias for determining an operating point of the read head element becomes being in the same direction as a magnetic field received from the bias magnetic field applying layer.

8. *(Original)* The disk drive according to claim 1, wherein the read head element is a spin-valve type GMR element having a hard magnetic field film for longitudinal bias and has a characteristic that a ratio between a product Mst of magnetization and film thickness of a free layer and a product Mrt of remnant magnetization and film thickness of the hard magnetic film ( $\text{Mrt}/\text{Mst}$ ) is set to 3 or more.